GSA Mock - 3

Q No. 6

a.

Define the variables.

Let the number of A-alphabet toy-blocks be x, B-alphabet toy-blocks be y, C-alphabet toy-blocks be z, and D-alphabet toy-blocks be k.

Write ratio x, y, z and k

The ratio of blocks A:B:C:D is 4:7:3:1. It implies that;

$$x : y : z : k = 4 : 7 : 3 : 1 \quad \text{eq i)}$$

From this equation, the ratio of only x and z will be:

$$x : z = 4 : 3$$

Rewrite the ratio in fraction

$$\frac{x}{z} = \frac{4}{3}$$

Apply the cross multiplications

$$3x = 4z \quad \text{— eq ii)}$$

The number of 'A' blocks is 50 more than the number of 'C' blocks.

It implies that;

$x = z + 50$

put it in eqii)

$3(z + 50) = 4z$

$3z + 150 = 4z$

$150 = 4z - 3z$

$150 = z$

Using symmetry property of equality

$z = 150$

Rewrite the eq i)

$x : y : z : k = 4 : 7 : 3 :)$

Consider the ratio of y and z only

$y : z = 7 : 3$

Write in fractions:

$$\frac{y}{z} = \frac{7}{3}$$

Apply cross multiplications

$3y = 7z$

Substitute $z = 150$ into the equation

$$3y = 7(150)$$
$$y = \frac{7(150)}{3}$$
$$y = 7(50)$$
$$y = 350$$

The number of 'B' blocks is 350.

b.

Find the sale tax.
The original price is 80$ while the sales tax is 10%.
10% of 80 is given by:

$$10\% \times 80$$
$$= \frac{10}{100} \times 80$$
$$= 8$$

The sales tax is 8$.

Find the Discount.
The original price is 80$ while there is 15% discount.
15% of 80 is given by

$$15\% \times 80$$
$$= \frac{15}{100} \times 80$$

$$= \frac{15 \times 8}{10}$$

$$= 12$$

There will be discount of 12 ฿.

Final Price

Note that discount will be subtracted and sales tax will be added to the original price.

The final price will be:

$$80 - 12 + 8$$

$$= 76$$

The final price will be 76 ฿.

C.

Find the time-taken by the train.

The formula for speed is given by:

$$S = \frac{d}{t}$$

where s is the speed, d is

The d is distance and t is the time.

$$s = \frac{d}{t}$$

Substitute $s = 36$ and $d = 42$ into the equation

$$36 = \frac{42}{t}$$

$$t = \frac{42}{36}$$

$$t = \frac{7}{6}$$

$$t = 1.1666\ldots$$

$$t \approx 1.167$$

$$\begin{array}{r|l} & 1.16 \\ \hline 6 & 7 \\ & -6 \\ \hline & 10 \\ & -6 \\ \hline & 40 \\ & 36 \\ \hline & 4 \end{array}$$

The time taken by the train is 1.167 hours.

Convert the time to a combination of hours and minutes.

Note that 1 ~~hours~~ hour has 60 minutes.

1.167 hours can be written as.

$$1.167 \text{ hours}$$
$$= 1 \text{ hours } (0.167 \times 60) \text{ minutes}$$
$$= 1 \text{ hours } (1.67 \times 6) \text{ minutes}$$

$$\therefore \quad \overset{4}{1}.\overset{6}{6}7$$
$$\times \quad 6$$
$$\overline{1.0.02}$$
$$= 10.02$$

$$= 1 \text{ hours } 10 \text{ minutes}$$

If train starts at 4 pm, after 1 hours and 10 minutes, when it reaches its spot, the time will be

5:10 pm.

d

i- teninsuperted
ii- hweti.

ii- The correct word for hweti will be "white"

i- The correct word for teninsuperted will be "

Q NO. 7

a.

formula for volume of cylinder:

$$V = \pi r^2 h$$

where V is the volume, r is the radius and h is the height of the cylinder.

$V = \pi r^2 h$

Substitute $r = 30$ and height $h = 1$ into the equation.

$V = \pi (30)^2 (1)$

let $\pi \approx 3.14$.

$\Rightarrow V = 3.14(30)^2 (1)$

$V = 3.14(900)$

$V = 314\ (9)$

$V = 2826$

The volume of the cylinder is about 2826

The height of the cylinder is

$h = 1\ m$

Note that there are 100 cm in 1 m.

Convert the unit to cm by multiplying the number by 100

$h = 1 \times 100$ cm

$h = 100$ cm.

Formula for volume of radius cylinder:

$$V = \pi r^2 h.$$

Substitute $r = 30$ and $h = 100$ into the equation

$$V = \pi (30)^2 (100)$$

let $\pi \approx 3.14$

$$\Rightarrow V = 3.14 (30)^2 (100)$$
$$V = 3.14 (900)(100)$$
$$V = 3.14 (90000)$$
$$V = 314 (900)$$
$$V = 282600$$

The volume of the cylinder is about 282600 cm^3.

b

Let the age of boys from youngest to oldest be a, b and c respectively.

Average of ages

Average is defined as sum of all elements divided by the number of elements.

The average of ages which are a, b and c is given by:

$$\frac{a+b+c}{3}$$

Note that the average of ages is 15 year.

Equate the expression for average of ages against 15

$$\frac{a+b+c}{3} = 15$$

$$a+b+c = 15 \times 3$$

$$a+b+c = 45 \quad \text{eq i)}$$

Ratio of the ages of boys.

The ratio of ages of boys is given by

$$3 : 5 : 7$$

It implies that

$$a : b : c = 3 : 5 : 7$$

The ratio of only 'a' and 'b' is given by:

$$a : b = 3 : 5$$

Write the ratio in fractions:

$$\frac{a}{b} = \frac{3}{5}$$

Apply the cross multiplications.

$$5a = 3b$$

$$b = \frac{5}{3}a$$

Similarly,
The ratio of only 'a' and 'c' is given by

$$a : c = 3 : 7$$

Write the ratio in fractions

$$\frac{a}{c} = \frac{3}{7}$$

Apply cross multiplications.

$$7a = 3c$$

$$\boxed{c = \frac{7}{3}a}$$

Putting the values of c and b in eq i)

$$a + b + c = 45$$

$$a + \frac{5}{3}a + \frac{7}{3}a = 45$$

Multiply each term by 3

$$3a + 5a + 7a = 135$$

$$15a = 135$$

$$a = \frac{135}{15}$$

$$a = \frac{27}{3}$$

$$a = 9$$

The age of a, the youngest boy is 9 years!

d.

The sides of the triangle are 5, 4, 6.

Triangle is not equivalent or isosceles as all sides are different.

check if the triangle is right-triangle

Suppose that the given triangle is a right-triangle.

Note that in a right triangle, the hypotenuse is always greater than the individual legs.

In the given scenario, the hypotenuse will be 6 and legs will be 5 and 4.

The right-triangle follows the Pythagorean theorem.

The Pythagorean Theorem is given by

$$a^2 + b^2 = c^2$$

Where a and b are the legs and c is the hypotenuse.

$a^2+b^2=c^2$

Substitute $a=4$, $b=5$ and $c=6$ into the equation:

$4^2+5^2=6^2$

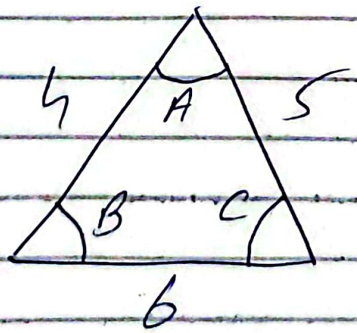
$16+25=36$

$41=36$

which is not true.

The given triangle is ~~ats~~ not a right triangle.

Let the angles of the triangles be A, B and C as shown in the triangle:



By, Note the ratio of sides of triangle is equal to ratio of its angle.

The ratio of sides is:
$4:5:6$

The ratio of corresponding angles will be
~~$A:B:C$~~
$C:B:A$

It implies that
$C:B:A = 4:5:6$

The ratio of only C and B is given by
$C:B = 4:5$
$\frac{C}{B} = \frac{4}{5}$
$B = \frac{5}{4}C$

The ratio of only 'C' and 'A' is given by
$C:A = 4:6$
$\frac{C}{A} = \frac{4}{6}$
$A = \frac{6}{4}C$

Recall that in a triangle

the sum of interior angles is 180°

$$A + B + C = 180$$

Put $A = \frac{6}{4}C$ and $B = \frac{5}{4}C$ into the equation:

$$\frac{6}{4}C + \frac{5}{4}C + C = 180$$

$$6C + 5C + 4C = 180 \times 4$$

(Multiplying each term by '4')

$$15C = 180 \times 4$$

$$C = \frac{180 \times 4}{15}$$

$$C = 12 \times 4$$

$$C = 48^\circ$$

$$A = \frac{6}{4}C$$

put $C = 48^\circ C$

$$A = \frac{6}{4}(48)$$

$$A = 72^\circ C$$

$B = \frac{5}{4}C$

Put $C = 48°$

$B = \frac{5}{4}(48)$

$B = 60°$

The angles of the triangle is 48°, 60° and 72°C.

C.

i - 8, 19, 52, 151, 447, —

The difference between the consecutive terms is:

19 - 8, 52 - 19, 151 - 52, 447 - 151

11, 33, 99, 296

Notice that 11, 33, 99 are such that:

$11 \times 3 = 33$

$33 \times 3 = 99$

But;

$99 \times 3 = 297$

while the number in series of differences of consecutive terms are, 11, 33, 99, 296.

The last term must be 297 instead of 296.

For the last term to be 297, 151 should be subtracted from 448 instead of 447.

8, 13, 52, 151, 447, —

The wrong number in this series is '447' it must be 448.

The correct sequence will be:

8, 13, 52, 151, 448, —

In this case, let the last number be x.

The difference between x and 448 will be; 297×3

$$297 \times 3 = -448 + x$$
$$-x = -448 - 297 \times 3$$
$$x = 448 + 297 \times 3$$
$$x = 448 + 891$$
$$x = 1339$$

The last missing term is 1339

ii -
11, 13, 17, 19, 23, —

The difference between consecutive terms is
13 - 11, 17 - 13, 19 - 17, 23 - 19
2, 4, 2, 4.

Note note that a sequence with alternating '2' and '4'.

The next term in the sequence
2, 4, 2, 4
will be '2'.

11, 13, 17, 19, 23, —
let the last missing term be x

It implies that
11, 13, 17, 19, 23, x

The difference between x and 23 will be 2.
$x - 23 = 2$
$x = 2 + 23$

$x = 25$.

The last missing term is 25.

Q. 3

a.

Chemical bonds in atom.

All the atoms form chemical bonds in order to stablize themselves.

Atoms have electrons revolving around its nucleus in orbits. The number of ~~neutrons~~ electrons in the valence shell determine the stability of the atom.

Atoms follow 2 rule to stablize themselves.
i- Octet rule
ii - Duplet rule.

i- Octet rule

Octet rule states that the number of electrons in the valence shell of the atom must be 8.

If the atom has more than 8 ~~atoms~~ electrons in its valence shell, it losses electrons and if it has less than 8 electrons it gains the electrons.

For example.

Na^+Cl^-

Na has 9 electrons in its valence shell, it loss 1 electron. Cl has 7 electrons in its valence shell, it gain 1 electrons.

This transfer of electron makes the chemical bond.

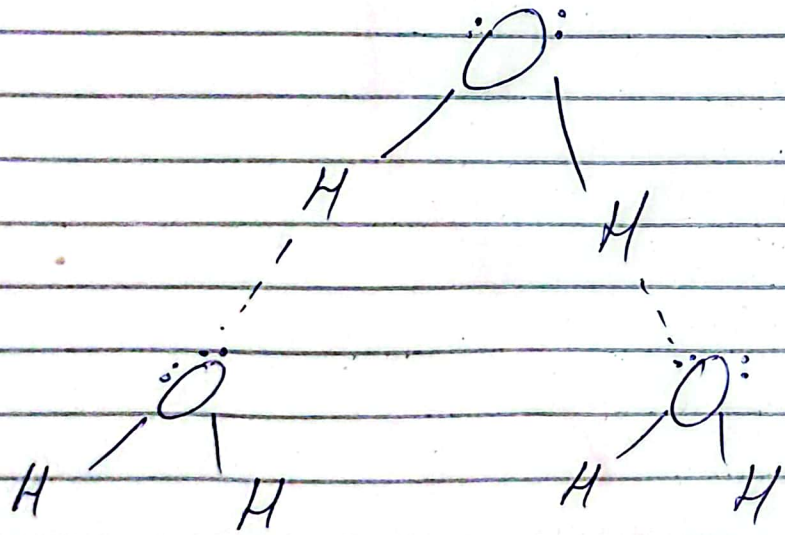
ii- Duplet rule

Likewise, ~~octet~~ duplet rule states that the number of electrons in the valence shell of the atom must be 2.

Covalent bond in water

The elect elements in the water molecule are hydrogen and oxygen.

The general formula is H_2O.



Note that both hydrogen and oxygen are non-metal, so they share electrons to stabilize themselves.

Oxygen has 6 electrons in its valence shell and each hydrogen has 1 electron in its valence shell

Oxygen shares 2 electrons, one with each hydrogen atom to stabilize itself. ~~Similarly~~, by completing 8 electrons in its valence shell (octet rule)

Hydrogen has 1 electron in its valence shell, so it shares 1 electron with oxygen to have a total of 2 electrons in its valence shell (duplet rule)

b.

Doping

Doping is addition of impurities in semi-conductors. Doping changes the concentration of elements in a semi-conductor and make it positively or negatively charged.

C.

Global Warming

The rise of the average temperature of the earth is called global warming.

Reasons of Global warming

The main reason for the global warming is the emission of green house gases.

Green house gases are as follow:

i- chlorofluro carbon
ii - Hydro fluro carbon
iii - Fluroflouro carbon
iv - Ozone (O_3)
v- Carbon dioxide
vi - Methane

This gases makes a green house around the earth which allows the inflow

of heat from sun but block the outflow of the heat emitted by earth. Simply, it trap the heat and rises the temperature

Demerits of Global warming

Global warming has the following consequances.

i - Glaciers melt at faster rate which affect the biodiversity and rises the water level in the rivers that will cause flood

ii - Flood, caused by melting glaciers, causes soil erosion and can destroy the landscape of an area.

iii - Global warming can affect the water cycle by changing the amount of rainfall, snowfall and hails.

Merits of Global warming

There're no merit of global warming. Although

There are some part of earth which are inhabitable due to extreme cold weather, can become habitable
For example:
Some areas of North America, Russia and Antarctica.

Note that Pakistan is most vulnerable to global warming. The average temperature of earth is increasing by 0.2°C per decade ~~year~~ in the last decade but the average temperature of Pakistan is ~~rising by 0.5°C~~ risen by 0.5°C in the last decade.

d.
Polio
Polio is a virus spread by a specific kind of fungi. Polio virus makes a person physically disable. There a vaccines which can prevent polio.

Challenges in Polio eradication in Pakistan

i- Lack of education

The literacy rate is Pakistan is about 62.3 %, it means a large population of Pakistan is illiterate. Due to lack of education, some Pakistani people consider polio vaccine as injurious to health. They think this vaccine can make a man infertile. They try to avoid polio vaccine and become susceptible to polio virus.

ii- Terrorism

Terrorism is one of the leading hurdles in polio eradications. Terrorist target the polio vaccination team, attack on them, try to kill them. Due to terrorist attacks, Pakistan is unable to vaccinate the children against polio.

Q. No. 2

c

Balanced diet

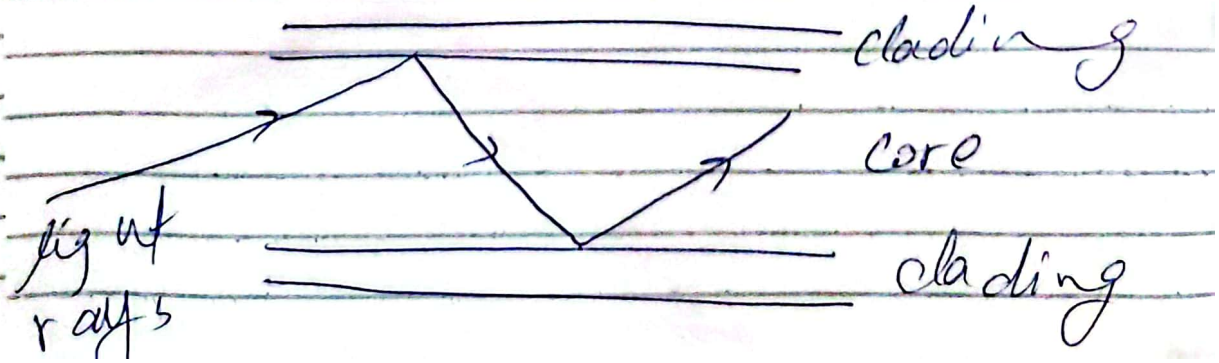
Balanced diet mean to eat a specific amount of all kinds of vegetable, fruits, cereals and meat to keep all the body functions normal.

Balanced diet basically means eating foods containing to get vitamins, proteins, fats and other all type of nutrients.

d.

Optic fibre

Optic fibers are the new technology which uses light rays to transfer data through a glass fiber. It uses refraction within the glass fiber to transmit the light rays

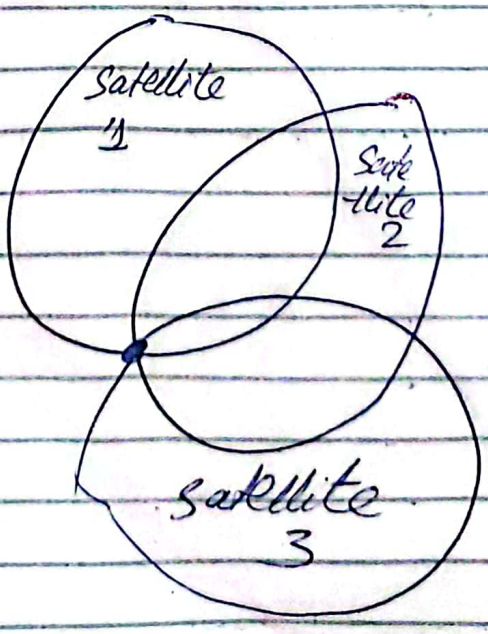


Now-a-days all the internet companies uses optical fibes for internet provision.

GPS

GPS stands for Global Positioning System. It is a system of 24 working satellites which is used to determine the exact position of a person, thing or any other object on the earth.

At a time, 3 GPS satellites are used to determine the position of a po object on earth.



a.

In today's technological world, electricity is required to run all the machines, industries and factories. Artificial intelligence is spreading at such as fast pace that every industry is integrating AI in it's operations. Soon, AI will be an inseperable part of every type of industries.

AI has been integrated in weapons, teaching, robotics and cinematography as many more. Soon we will see AI doing a large portion of work in every sector.

So, AI is the new electricity needed to run the industries, factories and machineries.

b.

We give command to CPU and it performs that operation, likewise brain also perform operation on human body.